

Amendments to the Claims

This listing of claims will replace the originally filed claims in the application.

Listing of Claims:

Claims 1 – 13 (cancelled)

Claim 14 (new): A method which may be used for determining the operating parameters of an installation for the cooling of articles, said method comprising:

- a) providing an installation for cooling articles, wherein said installation comprises:
 - 1) a chamber with an inlet and an outlet; and
 - 2) a cooling fluid;
- b) determining a temperature set point for said articles at said outlet;
- c) determining initial operating parameters for said installation; and
- d) performing a test cycle to test said operating parameters, wherein said test cycle comprises:
 - 1) predicting a temperature of said articles at said outlet, wherein said prediction is made on the basis of:
 - i) the operating parameters of said chamber;
 - ii) the thermodynamic and physical characteristics of said chamber; and
 - iii) the thermodynamic and physical characteristics of said articles;
 - 2) comparing said temperature set point with said predicted temperature; and
 - 3) modifying said operating parameters, when said comparison reveals a difference between said predicted temperature and said temperature set point.

Claim 15 (new): The method of claim 14, wherein said predicting said temperature further comprises predicting the behavior of said chamber based on the solution of heat balance equations on elementary volume slices of said chamber, based at least on the basis of:

- a) thermodynamic characteristics of said cooling fluid; and
- b) thermodynamic and physical characteristics of said chamber.

Claim 16 (new): The method of claim 15, further comprising predicting the behavior of said chamber based upon said operating parameters of said installation.

Claim 17 (new): The method of claim 16, wherein said operating parameters comprise at least one member selected from the group consisting of:

- a) the speed of a conveyor transporting said articles through said chamber;
- b) the loading factor; and
- c) the ventilation of the atmosphere in said chamber.

Claim 18 (new): The method of claim 15, wherein predicting said temperature further comprises predicting the behavior of said articles based upon solving a discretized heat conservation equation, as applied to a grid of spatial and temporal points which constitute a mesh of said articles, based at least on the basis of said thermodynamic and physical characteristics of said articles.

Claim 19 (new): The method of claim 18, wherein said predicting the behavior of said articles is carried out on the basis of said operating parameters of said installation.

Claim 20 (new): The method of claim 19, wherein said operating parameters of said installation comprise the temperature of said articles at said outlet.

Claim 21 (new): The method of claim 18, further comprising optimizing said predicting of the behavior of said articles through calculations involving the modification of said mesh of said articles using mathematical series.

Claim 22 (new) The method of claim 21, wherein said optimizing further comprises omitting the prediction calculations for spatial and temporal points of said mesh of said articles for which the enthalpy changes are below a predetermined threshold value.

Claim 23 (new): The method of claim 18, wherein predicting said temperature further comprises is based on both predicting the behavior of said chamber and on predicting the behavior of said articles.

Claim 24 (new): The method of claim 14, wherein modifying said operating parameters comprises manually modifying at least one operating parameter.

Claim 25 (new): The method of claim 14, wherein modifying said operating parameters comprises automatically modifying at least one operating parameter.

Claim 26 (new): The method of claim 14, wherein modifying said operating parameters comprises modifying at least one member selected from the group consisting of:

- a) the flow rate of said cooling fluid;
- b) the residence time of said articles in said chamber;
- c) the flow rate of gas extracted from said chamber;
- d) the gas speed-up rate;
- e) the gas recirculation rate; and
- f) the balance between the amount of incoming air and the amount of outgoing gas.

Claim 27 (new): A method which may be used for determining the operating parameters of an installation for the cooling of articles, said method comprising:

- a) providing an installation for cooling articles, wherein said installation comprises:
 - 1) a chamber with an inlet and an outlet; and
 - 2) a cooling fluid;
- b) determining a temperature set point for said articles at said outlet;
- c) determining initial operating parameters for said installation; and
- d) performing a test cycle to test said operating parameters, wherein said test cycle comprises:
 - 1) predicting a temperature of said articles at said outlet, wherein:
 - i) said prediction is made on the basis of:
 - aa) the operating parameters of said chamber;
 - bb) the thermodynamic and physical characteristics of said chamber; and
 - cc) the thermodynamic and physical characteristics of said articles; and
 - ii) said predicting comprises predicting the behavior of said chamber based on the solution of heat balance equations on elementary volume slices of said chamber, based at least on the basis of:
 - aa) thermodynamic characteristics of said cooling fluid; and

- bb) thermodynamic and physical characteristics of said chamber;
- 2) comparing said temperature set point with said predicted temperature; and
- 3) modifying said operating parameters, when said comparison reveals a difference between said predicted temperature and said temperature set point, wherein said operating parameters comprise at least one member selected from the group consisting of:
 - i) the flow rate of said cooling fluid;
 - ii) the residence time of said articles in said chamber;
 - iii) the flow rate of gas extracted from said chamber;
 - iv) the gas speed-up rate;
 - v) the gas recirculation rate; and
 - vi) the balance between the amount of incoming air and the amount of outgoing gas.

Claim 28 (new): A method which may be used for determining the operating parameters of an installation for the cooling of articles, said method comprising:

- a) providing an installation for cooling articles, wherein said installation comprises:
 - 1) a chamber with an inlet and an outlet; and
 - 2) a cooling fluid;
- b) determining a temperature set point for said articles at said outlet;
- c) determining initial operating parameters for said installation; and
- d) performing a test cycle to test said operating parameters, wherein said test cycle comprises:
 - 1) predicting a temperature of said articles at said outlet, wherein:
 - i) said prediction is made on the basis of:
 - aa) the operating parameters of said chamber ;
 - bb) the thermodynamic and physical characteristics of said chamber; and
 - cc) the thermodynamic and physical characteristics of said articles; and
 - ii) said predicting comprises:
 - aa) predicting the behavior of said chamber based on the solution of heat balance equations on

- elementary volume slices of said chamber, based at least on the basis of:
- aaa) thermodynamic characteristics of said cooling fluid; and
 - bbb) thermodynamic and physical characteristics of said chamber; and
 - bb) predicting the behavior of said articles based upon solving a discretized heat conservation equation, as applied to a grid of spatial and temporal points which constitute a mesh of said articles, based at least on the basis of said thermodynamic and physical characteristics of said articles;
- 2) comparing said temperature set point with said predicted temperature; and
 - 3) modifying said operating parameters, when said comparison reveals a difference between said predicted temperature and said temperature set point.